[redacted]

BODLEIAN
30 OCT 19
LIBRARY

TO THE

KINGS

Moſt Sacred Majeſty.

May it Pleaſe Your Majeſty;

ALl Your Kingdoms, Dominions, and Territories, being the happy Subjects of Your Cares, are therefore the proper Objects of Your View: Great Brittain, O Great Brittain, *Your Principal Iſland, here Humbly Preſents her ſelf unto Your Royall Preſence, View and Care; be Pleaſed, to interpret this her Obſequiouſneſs, to be her Duty; for ſince Your Majeſties ſafe Return, has already*

Graciouſly dayned, to View, and often to review her Shipings, Stores, Armories, Ordnance, Magazins, and Trade; Vouchſafe, Great Sir, Great Brittain *Your Royal Patronage, and once more, at ſome one hour, or two, to Gracelit with Your Auſpicious Aſpect, in this Mite, with all Humility Preſented, By,*

A Faithful Servant, of Your Sacred Fathers; And a Loyal Sufferer, for Your Sacred Majeſty; And by Pattent-Servant,

Dud Dudley.

TO THE

Honourable, His Majesties Great Council;

The High Court of Parliament.

Our Predeceſſors in former Ages, had both ſerious Conſultations, and Conſiderations, before they made thoſe many Wholeſom and Good Lawes, for the Preſervation of Wood, and Timber, of this Kingdome, 1 *Eliz.* 15. 23 *Eliz.* 5. 27 *Eliz.* 19. 28 *Eliz.* 3. 5. in whoſe dayes, and ſince in King *James*'s Reign, Ships in moſt Ports and Rivers of this Kingdom, (*Thames* Excepted) might have been built, for forty Shillings *per* Tunn; but now they can hardly be built for treble the value, wood and timber is ſo much decayed; therefore men of War, Trade of Merchants, of Fiſhing, of Navigating, unto Plantations will decay, if not timely prevent-

ed, which is hoped will be one of Your Principallest Cares, seeing our Enemies have carried Timber from *England*, and the Iron Works have much exhausted it; For the prevention of so great a Consumption, almost incureable: First is to put the Wholesome Laws in Execution; Secondly, not to permit Timber to be Exported. Thirdly, to animate, as King *James* did, and also Prince *Henry*, the making of Iron in *England*, *Scotland*, and *Wales* with Pit-cole, Sea-cole, and Peate; which if the Authour (who had a Pattent for it) had not been opposed, after he had made much good Iron with Pit-cole, it had long since, by his Inventions, been fully perfected. The Fourth is, to stop all the Exportation of Pit-cole, and Sea-cole (paying His Majesties Duty) if the Cole be in a fit place, to make Iron therewith. Fifthly, That the Authour, or his Agents may have power to preserve many thousand Tuns of Pit-cole, which are annually destroyed, for ever in *England*, *Scotland*, and *Wales* which are fit to make Iron;

and

and the Authour in this Treatise hath demonstrated it, being moved with pitty, seeing his Native Country decaying, Humbly offers but his Judgement, and and leaves the grave consideration thereof, to your Learned, and more serious Consultations and Actings, praying that you may animate good things,&new inventions,that may bring unto His Sacred Majesty, and all Loyal Subjects Safety, Strength, Wealth, and Honour by our Ships, and Men of War, Fishing, Navigation, and Merchandizing, unto Forreign Nations; but more especially, to, and from the Territories of *Great Britain*,our *North Indies* abounding in *Mines* and *Minerals*, that they that are of the Honourable Corporations of *Mines Royal*, and *Batteries*, or any others, would lay in a Common, or Joynt Stock, fully to set the *Mines* at Work, by imploying our idle,and burdensom supernumerary people therein, *Iron*, *Tin*,*Lead*,*Copper*, *Quicksilver*, *Silver* and *Gold*, besides many other *Minerals*, and *Marcesit's*, *Lapis Calaminaris*

minaris, *Antimonie*, *Maganes*, *&c.* also many *Mineral Earths* and *Precious Stones*: Did I call *Great Brittain* our *North Indies*? give me leave to repeat a passage till further satisfaction, of King *Josina* of *Scotland*, a great Phylosopher, Physitian, and Herbalist, living before Christ, 161. years, at which time, two venerable Phylosophers and Priests passing from *Portugall* to *Athens*, their Ship and Company, and Marriners, all perished at *Ros*, they only saved; after refreshing, and good Entertainment, the King desired of them what they understood by their Science of the Nature of the Ground of *Scotland*; after deliberate advisement, said, *There was more Riches and Profit to be gotten within the Veins of the Earth of* Scotland, *then above, for the winning of Mines and Metals*; *They knew this by the Influence of the Heavens*: This you may see in the Chronicles of *Scotland*.

My Dear Master, our Sacred Martyr, *Charles* the First of ever Blessed Memory, did animate the Authour by Granting him

him a Pattent, *Anno* 14 of His Reign, for the making of Iron, and Melting, Smelting, Extracting, Refining, and Reducing all Mines and Metals with Pit-cole, Sea-cole, Peat and Turf, which was Extinct, and Obstructed by reason of the War; and had not this unnatural and unparallel'd War been, His late Sacred Majesty himself had set at work many of His Mines, and much good had been produced to *Great Brittain* before this time.

At present the Authour is in good hope, and incessantly prayes, that the Mines be set at work in his dayes, by the Honourable Corporation of the Mines Royal, for he verily believeth the time to be near, when the Omnipotent God, before he Judge the World in Fire, will shew His Omnipotency unto the *Nations*, by revealing of the wonderful and incredible things of Nature, of which the Learned do believe very many to be, in the Mineral Kingdome, by working of Mines and Fusion of Metals, gotten by honest labour under ground, profitable to Man, and Acceptable with God.

I might here ſpeak ſomewhat of Superiour Planets producing Metal, *Saturn*, Lead: *Jupiter*, Tin: *Mars*, Iron: but theſe abound in *Great Brittain*, ſo do the Inferiour Planets produce *Venus*, Copper: *Mercury*, Quickſilver: *Luna*, Silver:

If God permit me health and leaſure from Sutes and Troubles, not onely to write of them, but alſo the manner of the Melting, Extracting, Refining, and Reducing of them with Pit-cole, Sea-cole, Peat, *&c.* In the interim to let you know that *Great Brittain* abounds with *Copper Mines*, much neglected, yet of great uſe for Ordnance, at Land, and alſo at Seas, and for the making of Braſs, with our *Lapis Calaminaris*, ſo much Exported by the *Dutch*, which doth hinder our manufactories of Braſs, and cauſes the *Dutch* and *Swedes* to raiſe the price of Copper and Braſs ever ſince our ſmall loſs at Sea by the *Dutch*. *Mercury*, Quickſilver is not wanting, but few Artiſts have made any Experiment of that Mine in this Kingdome.

Luna, Silver doth abound in *Great Britain*, eſpecially a very Rich Vein, Rake, or Fibrey thereof was wrought at *Binny-Hills* near *Lithgo* in *Scotland*, in the Authors dayes, ſome part of which he hath, is malleable Silver in the Oare or Mine, yet neglected. And ſo are many of our richeſt Mines in *England*, and *Wales*, *&c.* the cauſe is conceived to be the want of a general and joynt-ſtock for the imploying our idle people in getting, and working of the Copper, and Silver Mines.

Of the Planet *Sol*, Gold: I may not be ſilent, whoſe Golden, Glorious, Pure, Sulphurious, Percing, Spirit, communicating his virtue Mineral unto all things in the Mineral Kingdom, as well as to the Animal and Vegetable Kingdom, whoſe pure influence producing Gold, cauſed the poor indigent people of *Scotland*, which the Author did ſee, *Anno* 37 at *Shortlough*, ſix men to dig and carry with wheele-barrows, the common Earth or Mould unto Rivolets remote, out of which thoſe men did waſh Gold-grains,

as

as good as is in the ſand of the Rivers, in which Rivers many have gotten Gold, and ſeen Grains of *Sol*, near one ounce weight, both in the *Low-lands*, and in the *High-lands*; alſo he hath ſeen Gold gotten in *England*, but not ſo plentifull as in *Scotland*: For Sir *James Hope*, *An.* 1654. brought from *Scotland*, Baggs of Gold Grains unto *Cromwell*, ſome of which Grains were very large, and as fine as any Gold in the world, that is in Mines; thus I came to ſee the Baggs, taking a view of the *Low-lands*, and *High-lands* of *Scotland*, *Anno* 37, in which year, I ſpent the whole Summer (in opening of Mines, and making of diſcoveries) was at Sir *James Hopes* Lead Hills, near which I got Gold, and he coming to *London*, imployed Captain *David Acheſon*, a Refiner, whom I met with in *Scotland*, *Anno* 37 to find me out; when I came unto Sir *Iames Hope*, dwelling in *White Hall*, he produced the Baggs unto me, and poured the Gold out upon a board, in which was one large piece of Gold, which had to it adjoyning

joyning a large piece of white spar very transparent, which Cap. *David Acheson* yet living at *Edenburgh* saw; but I would never Act with Sir *Iames Hope*, hoping of these times to see good things acted, for I believe God is about to reveal many of his secrets, unto his Israel in this latter Age, which made me not to Answer the Letter of *Sir Iames Hope*, as followeth.

Edinburgh 26. June 1654.

Sir, *If I had found the opportunity before my parting, I purposed to have been a sutor to you, and I perswade my self, you are so kinde and generously disposed, that you would have answered my desire, and therefore also even at this distance adventure to offer it: And it is that you would confer upon me one breviate of your journey through the North of* Scotland; *as to the discovery of Minnerals upon some account, and at first veiw, this may seem as unreasonable of me desired, as improbable that you should grant it, but the circumstance of time and persons and substance of the things considered, I am not altogether out of hope of it; onely, I shall say, if you condescend to me in*

this

this, though it be more in ſatisfaction, to my curioſity, then for any deſigne I have upon the matter; yet you ſhall ſingularly oblige me to indeavour and be ready as opportunity ſhall offer, to expreſſe my thankfulneſſe, in what way you will preſcribe, that is in the power of;

your very affectionate brother
and Servant, *Iames Hope.*

This Sir James Hope, *was a Judge at the City of* Edinburgh, *and by* Cromwel *made Lord Marſhall of* Scotland.

My hope now is, that the Honourable and ingenious Corporation of the Mines Royall, will ſet the Mines at work, that my Inventions, in which I have ſpent much time and charge, in melting, ſmelting, extracting, refining and reducing of Mines and Mettals with Pitcoal, Seacoal and Peats; and have made with the ſame Fuell many hundred Tuns of good Merchantable Iron, into caſt works and Bars; may by the Inventioner be enjoyed according to the Act of Parliament, 21. *Jacob.* Seeing the Authour can make it appear

appear he hath been much obſtructed by lawſuits and the Wars hitherto: Deſires that his Talent of Undoubted truths (may not be buried)for the general good, but be brought to light, after all the ſad Sufferings of the Authour, whereby he may add unto his new Inventions, what he conceives fit to be done: That not onely this ſo exhauſted Kingdome may enjoy the benefit thereof, but alſo *Scotland* and *Wales* which abound with Coals, Iron, Stone and Mines of all ſorts, minerals and precious Stones, *&c.*

Yet from *England*'s Granery, *Scotland* making no Iron, and other Territories, have their thorow ſupply,not onely of Iron, but of Iron manufactories many, ſo hath *Wales*; yet might *Scotland* and *Wales* not onely ſupply themſelves, but ſupply His Sacred Majeſties other Territories with Iron and Iron Wares and Steel alſo, by Iron and Steel made with Pit-coale, Sea-coale and Peat; and thereby be helpfull unto themſelves and *England*, and all Plantations of his Majeſties, on this ſide and beyond the line,

To

To the Reader, especially of *England*, *Scotland* and *Wales*.

THe *injury and prejudice done unto me & to this Island, my native Country for the making of Iron, in cast works and bars with Pitcoal, Seacoal, Peat and Turff, and with the like feuell, to melt, extract, refine and reduce all Mines and mettals, moved me in the negligence of better Wits and Pens to apologise for it; in this ensuing Treatise, and believe me Reader, twas no private, or politick designe in my Invention, but meer zeal, becomming an honest man,* Patriæ, parentibus & amicis; *that Engaged me (after many others failed) in these Inventions, for the general good and preservation of Wood and Timber, which,*

Eque pauperibus, locupletibus eque,
Eque neglectis pueris senibusq; nocébit;

Therefore it concerns His sacred Majesty, his high Court of Parliament, all his Counsels, Mariners, Merchants, Royall and Loyall Subjects (the destruction of Wood and Timber) to lay it to heart, and helping hands, upon fit occasions, in these so laudable Inventions, of making Iron & melting of mines and refyning

of

of them with Pitcole, Seacole, Peat and Turf; for the preservation of Wood and Timber for maintenance of Navigation, men of War, the Fishing and Merchants Trade, which is the greatest strength of Great Brittain, and all other his Majesties Kingdomes and Territories, whose defence and offence next under God, consists by his sacred Majesties assisting care, and view of his men of War, Ships, experienced marrinours, merchants, Ordnance of Copper, Bras and Iron Armories, Steels and Iron, of all sorts; both of bars, squares, and cast works and which ought and may be suplyed from Scotland and Wales by Iron, Copper and Brasse, and made there, with Pitcole, Seacole and Peat; and which abound there and in England also; In Cornwall, Devonshire, Sommerset, Glocester, Stafford, Darby, York, Lancaster, Westmerland, Cumberland; are many Copper mines: so is there in Pembrook, Carmarthin, Merionith and Denbyshires, also there are very many rich Coper mines in very many places in Scotland, at Sterling, at Dumfad and many other places well known unto the Authour,

Dud Dudley's
Mettallum Martis.

THat *Great Brittain* with her Men of Warr, Fleets and Shiping, have had in all Ages, and in theſe latter Ages, as great Succeſs at Seas as any people whatſoever in the Univerſe, cannot modeſtly be denied in 88, overthrowing that Invincible Armado ſo long a preparing, and ſince other Navies alſo; and whoſe Armadoes, Navies, Armes, and Men, have been a Terrour to other Nations; nay her own Grand Magazins, are the very Granary from whence all His Sacred Majeſties Kingdomes, Dominions, and Territories both in the *Eaſt* and *Weſt-Indies*, on this ſide and beyond the Line, they have their whole and thorow ſupply of Ship-

ing, Men, Armes, Food and Rayment, and more then can be, from any Kingdom of the Christian World.

Now if Wood and Timber should decay still, and fail, the greatest Strength of *Great Brittain*, her Ships, Mariners, Merchants, Fishings, and His Majesties Navies, and Men of War, for our Defence, and Offence would fail us, which before, and since 88 made his Sacred Majestyes Prodecessors, Queen *Elizabeth*, and her Great Council, the then Parliament, to make Lawes for the preservation of *Wood* and *Timber*, especially near any Navigable River; 1 *Eliz.* 15. 27 *Eliz.* 19. 28 *Eliz.* 3. 5. 23 *Eliz.* 5. All which Laws, and others, for the Preservation of Wood and Timber are still in force, but not duly Executed; also King *Iames* His Sacred Majesties Grand-father, and *Prince Henry*, for the Preservation of Wood and Timber in this Island, did in the 9*th* Year of His Reign, Grant His Letters Pattents of Priviledge unto *Simon Sturtevant* Esq; for 31 years, for the making of Iron with Pit-

Pit-cole and Sea-cole for the preſervation of Wood and Timber of *Great Brittain* ſo greatly then conſumed by Iron works; This Invention was by King *Iames*'s command to be at large put in Print, which Book did contain near a quire of paper in quarto, called, *Simon Sturtevant* His *Mettallica*. *Anno* 1612. *May* 22. Printed by *George Eld*, *Cum Privilegio*.

After *Simon Sturtevant* could not perform his making of Iron with Pit-cole or Sea-cole, according unto his Engagement, King *Iames*, and Prince *Henry*, cauſed him to render up his Pattent, and a new Pattent was Granted unto *John Rovenſon* Eſq; who alſo was Enjoyned to write a Book of his Inventions, called, *Rovenſon*'s *Mettallica*. Printed for *Thomas Thorp*, *Cum Privilegio*: *May* 15. *An.* 1613.

After *Iohn Rovenſon* Eſq; had often failed with his Inventions, and great undertakings, *Gombleton* Eſq; a Servant of Queen *Ann*'s, undertook (by Pattent) to perform the Invention of making of Iron with Pit-cole, and Sea-cole;

but he being as confident of his Invention as others, did Erect his works at *Lambeth*, which the Author view'd; and *Gumbleton* failing, the Learned, and Ingenious Doctor *Iorden* of *Baths*, the Authors Acquaintance, and ſundry others obtained Patents for the making of Iron, and melting of Mines with Pit-cole and Sea-cole, for the preſervation of Wood and Timber all which Inventions and endeavours to Effect and Perfect the ſaid Works, have been by many heretofore well known, to have worthily attempted the ſaid Invention, though with fruitleſs ſucceſs.

Having ſeen many of their failings, I held it my Duty to endeavour, if it were poſſible to Effect and Perfect ſo laudable, and beneficial, and alſo ſo much deſired Inventions, as the making of Iron into caſt Works and Bars; and alſo the Melting, Extracting, Refining and Reducing all ſorts of Mines, Minerals and Metals, with Pit-cole, Sea-cole Peat and Turf, for the preſervation of wood and timber,

ſo

ſo much exhauſted by Iron Works of late.

Having former knowledge and delight in Iron Works of my Fathers, when I was but a Youth; afterward at 20 years Old, was I fetched from *Oxford*, then of *Bayliol* Colledge, *Anno* 1619, to look and manage 3 Iron Works of my Fathers, 1 Furnace, and 2 Forges, in the Chaſe of *Penſnet* in *Worceſter-ſhire*, but Wood and Charcole, growing then ſcant, and Pit-coles, in great quantities abounding near the Furnace, did induce me to alter my Furnace, and to attempt by my new Invention, the making of Iron with Pit-cole, aſſuring my ſelf in my Invention, the loſs to me could not be greater then others, nor ſo great, although my ſucceſs ſhould prove fruitleſs; But I found ſuch ſucceſs at firſt tryal animated me, for at my tryal or blaſt, I made Iron to profit with Pit-cole, and found *Facere eſt addere Inventioni*.

After I had made a ſecond blaſt and tryal, the feſibility of making Iron with

Pit-cole and Sea-cole, I found by my new Invention, the quality to be good and profitable, but the quantity did not exceed above 3 Tuns *per* week: After I had brought my Invention unto some perfection, and profitable, doubted not in the future to have advanced my Invention, to make quantity also.

Immediately after my second tryal, I wrote unto my Father what I had done, and withall, desired him to obtain a Pattent for it from King *Iames* of Blessed Memory; the Answer to which Letter I shall insert, only to shew the forwardness of King *Iames*, in this his much animating the Inventor, as he did both *Simon Sturtevant*, *Iohn Rovenson*, Doctor *Iordanie* and others; The Letter follows;

Son *Dudley*,

The Kings Majesty being at New-Market, *I sent* Parkes *thither on Saturday to some Friends of mine, to move the Kings Majesty for my Pattent, which he coming on Sunday Morning, in the Afternoon His Majesty*

sent

sent a Warrant to Master Atturney to dispatch my Pattent, for the which I am infinitely bound unto His Majesty, that it pleased Him of His Great Grace and Favour to dispatch it so soon; I have been this night with Master Atturney, who will make hast for me; God Bless you, and Commend me unto all my Friends:

March 10. 1629. Your Loving Father, *Edward Dudley.*

This *Richard Parkes*, à Parks-house Esq; in the Letter before mentioned, was the Authors Brother in Law, which did about 1 year after the *Pattent* was granted, carry for the Author much good Merchantable Iron unto the *Tower*, by King *Iames*'s command to be tryed by all Artists, and they did very well approve of the Iron, and the said *Parkshouse* had a fowling Gun there made of Pit-cole Iron, with his name gilt upon the Gun, which Gun was taken from him by Colonel *Levison* Governour of *Dudley* Castle, and never restored.

The

The ſaid *Richard Parkshouſe*'s ſon my Nephew, *Edward Parkshouſe*, the 5th. of *January* 1645. preſſed me much to put Pen unto Paper, to ſhew what I have done in the invention of making of Iron with Pitcoale and Seacoal, not unknown unto this Country, and to my brother *Folliott*, Eſq; and my Nephew *Parkshouſe* Eſq; and to my Kinſman Maſter *Francis Dingley*, to whom I intend to leave the Secrets of my Inventions, notwithſtanding all my ſad ſufferings from time to time this forty Years in the inventions, my Sufferings in the War; and my Eſtate ſold for my Loyalty; and alſo my ſad ſufferings and obſtructions ſince his Sacred Majeſties happy Reſtauration many wayes; and alſo upon ſundry and many references, at the Authors very great charge, pains, and time ſpent of Foure years in his aged dayes, for the general good, by his inventions for the preſervation of Great *Britain*'s Wood and Timber.

Now let me ſhew ſome Reaſons that induced me to undertake theſe Inventions,

tions, after the many failings of others, well knowing that within Ten miles of *Dudley* Caſtle there to be neer 20000. Smiths of all ſorts, and many Iron works at that time, within that Circle decayed for want of Wood (yet formerly a mighty Woodland Country.)

Secondly, The Lord *Dudley*'s Woods and Works decayed, but Pitcoal and Iron, Stone or Mines abounding, upon his Lands, but of little Uſe.

Thirdly, Becauſe moſt of the Coale-Mines in theſe parts, as well as upon the Lord *Dudley*'s lands, are Coals, Ten, Eleven, and Twelve yards thick; the top or the uppermoſt Cole, or vein, gotten upon the ſuperficies of this Globe or Earth, in open works.

Fourthly, Under this great thickneſs of Coal, is very many ſorts of Iron, Stone Mines, in the Earth Clay or Stone earth, like bats, in all four yards thick; alſo under theſe Iron mines is ſeverall yards thick of Coals, but of theſe in an other place more convenient.

Fifthly,

Fifthly, Knowing that when the Colliers are forced to ſinck Pits for getting of ten yards thick or more, that be gotten under the ground, being ſmall are of little or of no uſe in that inland Country nor is it worth the drawing out of the Pits, unleſſe it might be made uſe of by making of Iron therewith into caſt works or Bars.

Sixthly, Then knowing that if there could be any uſe made of the ſmal-coale that are of little Uſe, then would they be drawn out of the Pits, which coles produceth often times great prejudice unto the Owners of the works and the work it ſelf, and alſo unto the Colliers, who caſting of the ſmalcoles together, which compelling neceſſity enforcing the Colliers ſo to do, for two cauſes; one is to raiſe them to cut down the ten yards thickneſſe of coles drawing onely the bigger ſort of cole, not regarding the leſſer or ſmall cole, which will bring no money; ſaying, *He that liveth longeſt let him fetch fire further*: Next, Theſe Colliers

muſt

muſt caſt theſe coles, and ſleck or droſſe out of their wayes, which ſulphurious ſmall cole and crouded moyſt ſleck heat naturally, and kindles in the middle of thoſe great heaps; often fals the cole-works on Fire, and flaming out of the Pits, and continue burning like *Ætna* in *Cicily*, or *Hecla* in the *Indies*.

Yet when theſe looſe Sulphurious compoſts of cole and ſleck, being conſumed in proceſſe of time, the Fire decayes, yet notwithſtanding the Fire hath continued in ſome Pits many years; yet colliers have gotten coles again, in thoſe ſame Pits, the Fire not penitrating the ſolid and firme wall of coles, becauſe *Pabulum ignis eſt Aer*, the Ayre could not penetrate, but paſſe by it in the looſe cole and ſleck; for comming into thoſe pits afterwards, I have beheld the very blows of Pikes or tools that got the coles there formerly. Alſo from theſe Sulphurious heaps, mixed with Iron, Stone (for out of many of the ſame pits is gotten much Iron, Stone, or Mines; the Fires heating

vaſt

vaſt quantities of Water, paſſing thorow theſe Soughs or Adits, becometh as hot as the Bath at *Bathe*, and more healing and ſovereign even for old Ulcers and Sores; but becauſe many of theſe Baths doe proceed not onely from common Sulphur and vitriol of *Mars*, but alſo from *Solars* ſulphur in this Iron ſtone, I hope, *Filii Artis*, will excuſe my digeſion from the making of Iron with Pitcole, Seacole, Peat or Turff, and the melting of mines and mettals and refining of the ſame, with the like fuell: the firſt Pattent being granted by King *James* for 31. Years in the 19th year of his Reign upon juſt and true information, that the Authour had the year before made many Tuns of Iron with Pitcole at a Furnace or Iron-work, in the Chaſe of *Penſnet*, in the County of *Worceſter*, beſides caſt Iron Works of ſundry ſorts with Pitcoles; and alſo at two Forges or Iron Mills, called, *Cradly Forges*, fined the ſaid Iron into Merchantable good Bar Iron: But the year following, the grant

or

or Pattent for making of Iron with Pitcole or Seacole, There was so great a Flood, by rain, to this day, called the great *May-day-Flood*, that it not onely ruinated the Authours Iron works, and inventions, but also many other mens Iron works and inventions; but also many other mens Iron works: and at a market Town called *Sturbridge* in *Commitate Wigorœ*, although the Authour sent with speed to preserve the people from drowning; one resolute man was carried from the Bridge there in the day time, and the nether part of the Town was so deep in Water that the people had much ado to preserve their lives in the uppermost rooms in their Houses.

My Yron works and inventions thus demolished, to the joy of many Iron masters, whose works scaped the Flood and who had often disparaged the Authors Inventions, because the Authour sold good Iron cheaper then they could afford it; and which induced many of the Iron masters to complain unto King *Iames*, averring,

verring, that the Iron was not Merchantable; As ſoon as the Authour had repaired his works and inventions (to his no ſmall charge) they ſo far prevailed with King *Iames*, that the Authour was commanded with all ſpeed poſſible, to ſend all ſorts of Bar Iron up to the Tower of *London*, fit for making of Muſquets, Carbines and Iron for great Bolts, fit for Shipping, which Iron being ſo tryed by Artiſts and Smiths, that the Iron maſters and Iron-mongers were all ſilenced until 21th. of King *Iames*: At the then Parliament, all *Monopolies* were made *Null*, and diverſe of the Iron-maſters endeavouring to bring the invention of making Iron with Pitcole, Seacole, Peat and Turff, within the compaſſe of a *Monopoly*; but the Lord *Dudley* and the Authour did prevaile; yet the Pattent was limitted to continue but Fourteen years; after which Act the Authour went on with his invention cheerfully, and made annually great ſtore of Iron, good and merchantable, and ſold it unto diverſe men yet

living at Twelve pounds *per* Tun; I also made all sorts of cast Iron Wares, as Brewing-Cysterns, Pots, Morters, and better and cheaper than any yet were made in these Nations, with *Charcoles*; Some of which are extant to be seen by any man (at the Authours House in the City of *Worcester*) that desire to be satisfied of the truth in the Invention.

Afterwards, The Authour was outed of his works and inventions before mentioned by the Iron-masters and others wrongfully, over long to relate: yet being unwilling his Inventions (having undergone much charge and pains therein) should fall to the ground, and be buried in him, made him to set forward his Invention again, at a Furnace called, *Himly Furnace* in the County of *Stafford*, where he made much Iron with Pit-cole, but wanting a Forge to make it into bars, was constrained for want of Stock to sell the Pig-Iron unto the Charcole Iron-masters, who did him much prejudice, not onely in detaining his stock, but also

diſparaging the Iron; *Himley* Furnace being Rented out unto Charcole Iron-Maſters.

The Authour Erected a new large Furnace on purpoſe, 27 foot ſquare, all of ſtone for his new invention, at a place called, *Haſco Bridge*, in the Pariſh of *Sedgley*, and County of *Stafford*; the Bellows of which Furnace were larger then ordinary Bellows are, in which work he made 7 Tuns of Iron *per* week, the greateſt quantity of Pit-cole-Iron that ever yet was made in *Great Brittain*; near which Furnace, the Author diſcovered many new Cole-mines 10 yards thick, and Iron-Mine under it, according to other Cole-works; which Cole-works being brought unto perfection, the Author was by force thrown out of them, and the Bellows of his new Furnace and Invention, by riotous perſons cut in pieces, to his no ſmall prejudice, and loſs of his Invention, of making of Iron with Pit-cole, Sea-cole, *&c.* So that being with Law-Suites, and Riots, wearied and diſ-

abled

abled to proſecute his Art and Invention at preſent, even untill the firſt Pattent was extinct : Notwithſtanding the Author his ſad Sufferings, Impriſonments wrongfully for ſeveral thouſand pound in the *Counter* in *London*, yet did obtaine a new Pattent, dated the 2*d* of *May*, *Anno* 14. *Caroli Primi* of ever Bleſſed Memory, not only for the making of Iron into caſtworks, and bars, but alſo for the Melting, Extracting, Refining and Reducing of all Mines, Minerals and Mettals, with Pit-cole, Sea-cole, Peat, and Turf, for the preſervation of Wood and Timber of this Iſland ; into which Pattent, the Author, for the better ſupport and management of his Invention, ſo much oppoſed formerly at the Court, at the Parliament, and at the Law, took in *David Ramſey* Eſquire, Reſident at the Court; Sir *George Horſey* at the Parliament ; *Roger Foulke* Eſquire, a Counſellour of the *Temple*, and an Ingenious Man ; and alſo an Iron Maſter, my Neighbour, and one who did well know my former Sufferings, and

what I had done in the Invention of making of Iron with Pit-cole, *&c.*

All which ſaid Patentees Articled the 11*th* of *Iune* following, they Grant not only to pay the Authour all the charges of paſſing the Pattent laid down by him, but alſo to lay in for a common and joynt-ſtock each man of the four, one hundred pounds, and ſo from time to time, what more ſtock any three of the Pattentees ſhould think fit to be laid in for the making of Iron into caſt works and bars, and likewiſe for the Melting, Extracting, Refining and Reducing of all Mines, Minerals, and Metals, with Pit-cole, Sea-cole, Peat and Turf, which Articles are yet extant.

Now let me without offence inſert the oppoſition we all had, by means of powerfull Iron-Maſters, with Sir *Philibeard Vernat*, a *Dutch* Man, and Captain *Whitmore*, who pretended much unto his late Sacred Majeſty, but performed not their undertaking, which cauſed the Author, and his Partners thus to Petition.

To the Kings Moſt Excellent Majeſty:

The Humble Petition of Sir *George Horſey* Knight; *David Ramſey*, *Roger Foulke*, and *Dud Dudley*, Eſquires:

Humbly Sheweth,

That whereas Your Petitioners, being called before the Right Honourable, the Lord Keeper by Your Majeſties Appointment, touching the making of Iron with Pit-cole, Sea-cole, Peat and Turf, for which they have Your Majeſties Pattent; and ſeeing that Sir Philibeard Vernat, *and Captain* Whitmore, *who are not Inventors, have obtained a Pattent alſo for the ſame; yet before their Pattent Granted,* Sir Philibeard *was ordered at Council-board, according to his Great Undertaking, to perfect his Great Undertaking and Invention within Two Years, and there hath been near Three Years paſſed, and yet have made little or no Iron; ſtill he Oppoſeth Your Petitioners, and doth neither benefit himſelf, but hinders Your Majeſty, and the Kingdom.*

The reference unto the Petition followeth; At the Court at *Greenwich*, *May* 20. 1638. His Majesty is pleased to refer this Petition to Master Atturney, and Master Solicitor General, to call the Petioners before them, and to compose the differences between them; (if they can) or otherwise, to certifie his Majesty their opinions therein:

Sir Sidney Mountegue was then
Master of the Requests.

But Sir *Philibeard Vernat*, and Captain *Whitmore* never appeared any more for their Invention.

Not long after the Wars came on, and caused my partners to desist, since which they are all dead, but the Author, and his Estate (for his Loyalty unto his late Sacred Majesty) and Master, as by the Additional Act of Parliament may appear) was totally sold.

Yet nevertheless, I still endeavoured not to bury my Tallent, took in two Partners

Partners into my Inventions, *Walter Stevens* of *Briſtow* Linnen Draper, and *John Ston* of the ſame City Merchant, after the Authour had begun to Erect a new work for the Inventions aforeſaid, near *Briſtow*, *Anno* 51. and there we three Partners had in ſtock near 700l. but they not only cunningly drew me into Bond, entered upon my Stock and Work, unto this day detained it, but alſo did unjuſty enter Staple Actions in *Briſtow* of great value againſt me, becauſe I was of the Kings Party; unto the great prejudice of my Inventions and Proceedings, my Pattent being then almoſt extinct; for which, and my Stock, am I forced to Sue them in Chancery.

In the interim of my proceedings, *Cromwell*, and the then Parliament, granted a Pattent, and an Act of Parliament unto Captain *Buck* of *Hampton Road*, for the making of Iron with Pit-cole and Sea-cole; *Cromwell*, and many of his Officers were Partners, as Major *Wildman* and others; many Doctors of Phyſick, and

Merchants, who ſet up diverſe and ſundry Works, and Furnaces at a vaſt charge, in the Forreſt of *Dean*, and after they had ſpent much in their Invention and Experiments, which was done in ſpacious Wind-Furnaces, and alſo in Potts of Glaſs-houſe Clay; and failing afterwards, got unto them an Ingenious Glaſs-Maker, Maſter *Edward Dagney* an *Italian* then living in *Briſtow*, who after had made many Potts, for that purpoſe went with them into the Forreſt of *Dean*, and built for the ſaid Captain *Buck* and his Partners, a new Furnance, and made therein many and ſundry Experiments and Tryals for the making of Iron with Pit-cole and Sea-cole, *&c.* But he failing, and his Potts being all broken, he did return to *Briſtow* fruſtrate of his Expectation; but further promiſing to come again, and make more Experiments; at which time Maſter *John Williams*, Maſter *Dagneys*, Maſter of the Glaſs-Houſe was then drawn in to be a Partner for 300*l.* depoſited, and moſt of

it

it ſpent, the ſaid *Williams* and *Dagney* hearing that the Authour had knowledge in the making of Iron with Pit-cole, Sea-cole, *&c.* they from Cap. *Buck*, and the other Partners importuned the Author, who was at that time in great danger by the Parliament, (being a Colonel of the Kings Party) to go along with them into the Forreſt of *Dean*, which at that time durſt not deny; Coming thither, I obſerved their manner of working, and found it impoſſible, that the ſaid *Edward Dagney* by his Invention ſhould make any Iron with Pit-cole or Sea-cole, in Pots to profit: I continued with them till all their Potts and Inventions failed; at every Dinner and Supper, Captain *Buck*, Captain *Robins*, Doctor *Ivie*, Doctor *Fowler* and others, would aſke the Author why he was ſo confident that Iron in quantity could not be made by their new Inventions? I found it a difficult thing to diſſwade the Partners from their way, ſo confident were they to perform the making of Iron with Pit-cole or Sea-cole to profit;

profit; that they desired me to come again a second time into the Forrest to see it Effected: But at that time, I saw their failings also.

Yet nevertheless Captain *Buck*, and his Partners Erected new Works at the City of *Bristow*, in which they did fail as much as in their former Inventions; but Major *Wildman*, more barbarous to me then a Wildman, (although a Minister bought the Authors Estate, near 200*l*. *per Annum*, intending to compell from the Author his Inventions of making of Iron with Pit-cole; but afterwards passed my Estate unto two Barbarous Brokers of *London*, that pulled down the Authors two Mantion-Houses; sold 500 Timber-Trees off his Land, and to this day are his Houses unrepaired.

Anno 1655. Captain *Buck* and his Partners wearied of their Invention, desisting, *An.* 1656. Captain *John Copley* from *Cromwell* obtained another Pattent for the making of Iron with Pit-cole and Sea-cole; He and his Partners set up their Works

Works, at the Cole-Works near *Briſtow*, and endeavour'd by Engeneers aſſiſtance to get his Bellows to be blown, at, or near the Pits of Cole, with which Engines the Work could not be performed: But the Author coming to ſee the ſaid Works, and after many Diſcourſes with Captain *Copley*, his former Acquaintance, told him plainly, if his Bellows could have been blown by thoſe Engines, yet I feared he could not make Iron with Pit-cole or Sea-cole; he ſeemed diſcontented, whereupon, and without thoſe Engines I made his Bellows to be blown feiſibly, as by the Note under his hand appears (the firſt Note) followeth;

1656. *December* 30.

Memorandum, *The day and year above-written, I* John Copley *of* London, *Gent. Do acknowledge, that after the Expence of diverſe Hundred Pounds to Engineers, for the making of my Bellows to blow, for the making of Iron with Pit-cole or Sea-cole near* Briſtow, *and near the Forreſt of* Kings-wood;

That

that Dud Dudley *Esq; did perform the blowing of the said Bellows at the Works or Pits aboveſaid, a very feiſible and plauſible way, that one man may blow them with pleaſure the ſpace of an hour or two; And this I do acknowledge to be performed with a very ſmall charge, and without any money paid to him for the ſame Invention:*

John Copley.

Captain *John Copley* thus failing in his Inventions, *An.* 1657. he went into *Ireland*, and all men now deſiſting from the Inventions of making of Iron with Pit-cole and Sea-cole: The Author, *Anno* 1660. being 61. years of Age, and moved with pitty, and ſeeing no man able to perform the Maſtery of making of Iron with Pit-cole or Sea-cole, immediately upon his Sacred Majeſties happy Reſtauration, the ſame day he Landed, Petitioned that he might be reſtored to his place, and his Pattent obſtructed, revived for the making of Iron with Pit-cole, Sea-cole, Peat and Turf, into caſt

Works

Works and Bars, and for the Melting, Extracting, Refining and Reducing of all Mines, Mettals and Minerals, with Pit-cole, Sea-cole, Peat and Turf; which ſaid Laudable Invention, the Author was and is unwilling ſhould fall to the ground and dye with him, neither is the Miſtery, or Maſtery of the Invention Effected and Perfected by any man known unto the Authour, as yet, either in *England*, *Scotland* or *Wales*; all which three abound with Pit-cole or Sea-cole, and do overmuch furniſh other Kingdomes many with Pit-cole and Sea-cole, when they might make far better uſe of it themſelves, eſpecially *Scotland* and *Wales*, both for the making of Iron into caſt Works and Bars; and alſo for the making of Steel, and Melting, Extracting and Refining of Lead, Tin, Iron, Gold, Copper, Quickſilver, and Silver, with Pit-cole and Sea-cole.

I ſhall not trouble you with the Petition, or my reaſons and deſires that were annexed unto it, for the making of Iron,

and

and Melting of Mines, *&c.* with Pitcole, *&c.* they are over long to relate, only the Reference to them is thus; (after my first Petition was lost, I Petitioned again.)

At the Court at Whiteh. 22. of *June* 1663.

His Majesty is graciously pleased to refer the consideration of this Petition to Master Atturney, and Solicitor General, or to either of them, together with the Petitioners Reasons and Desires hereunto annexed; and they, or either of them, are to inform, and certifie His Majesty, what they, or either of them in their Judgements respectively conceive fit for His Majesty to do concerning the Petitioners Humble Request, and then His Majesty will declare his further pleasure.

Robert Mason, *Master of Requests.*

After Master Atturney, and Sollicitor General would do nothing upon the Reference;

ference; the Author Petitioned His Sacred Majesty sitting at the Council-Board, for the Renewing of his Pattent, for making of Iron, and Melting, of Mines with Pit-cole, Sea-cole often obstructed; the reference to that Petition followeth.

At the Court at Whitehall, *July* 25. 1660.

Upon reading of a Petition this day at the Board, being the same in terminis with this above-written, which His Majesty was graciously pleased by a Reference under the hand of Doctor *Mason*, one of the Masters of the Requests, to refer to the consideration of Master Atturney, and Master Solicitor General, together with the Petitioners Reasons and Desires thereunto annexed, to the Consideration of the Lords, and others Commissioners for the Treasury, who upon Examination of the particulars, are to give such order thereupon, as they shall find most proper for His Majesties Service. *Sir* Edward Walker *was Clark to the Council, and Garter King at Armes.*

The Author, during the Lords Commissioners their time, could get no Order upon his Reference; But his Petition was left, with the now Right Honourable, the Lord Treasurer, to take or grant further order therein, but the Author hath gotten hitherto no order.

Therefore compelling necessity doth constrain (having prosecuted his Petition hitherto) him to desist from his Inventions, in which he hath taken more pains, care and charge, then any man, to perfect his new Invention in these Kingdomes.

Although the Author hath not as yet so fully perfected or raised his invention to the quantity of Charcole Iron Furnaces, yet the Authors quantity being but seven Tuns *per* week at the most, together with the quality of his Iron made with Pit-cole and Sea-cole, hath the most eminent Triplicity of Iron of all that can be desired in any new Invention.

1. More Sufficient. 2. More Cheap. 3. More Excellent.

Upon

Upon which triplicity, the Authour might enlarge himself, but shall not be tedious, only give me leave to mention that there be three sorts of Cast Iron;

1. The first sort is Gray Iron.

2. The second sort is called Motley Iron, of which one part of the Sowes or Piggs is gray, the other part is white intermixt.

3. The third sort is called white Iron, this is almost as white as Bell-Mettle, but in the Furnace is least fined, and the most Terrestrial; of the three, the Motley Iron is somewhat more fined, but the Gray Iron, 1. is most fined, and more sufficient to make Bar-Iron with, and tough Iron to make Ordnance, or any Cast-Vessels, being it is more fined in the Furnace, and more malliable and tough, then the other two sorts before mentioned; and of this sort, is the Iron made with Pit-cole, Sea-cole for the most part, and therefore more sufficiently to be preferred.

2. More cheaper Iron there cannot be made, for the Author did ſell pigg or caſt Iron made with Pit-cole at four pounds *per* Tun, many Tuns in the twentieth year of King *James*, with good profit; of late, Charcole Pig-iron hath been ſold at ſix pounds *per* Tun, yea at ſeven pounds *per* Tun hath much been ſold of late years.

Alſo the Author did ſell Bar-iron, Good and Merchantable, at twelve pounds *per* Tun, and under, but ſince Bar-iron hath been ſold for the moſt part ever ſince at 15*l.* 16*l.* 17*l.* and 18*l.* *per* Tun, by Charcole Iron-Maſters.

3. More Excellent for diverſe Reaſons, and principally, being the meanes whereby the Wood and Timber of this Iſland almoſt exhauſted, may be timely preſerved yet, and vegetate and grow again unto his former wonted cheapneſs, for the maintenance of Navigation, which is the greateſt Strength of *Great Brittain*, whoſe Defence and Offence, for all the Territories that belong unto

it,

it, next under God and his Vice-Gerent, our Sacred Majeſties Cares, conſiſts moſt of Shiping, Men of War, Experienced Mariners, Ordnances, Ammunition, and Stores, the Ordnance made therewith will be more gray and tough, therefore more ſerviceable at Sea and Land, and the Bar-iron will wall, rivet, and hold better then moſt commonly Charcole Iron.

2. More Excellent, not onely in reſpect the Invention of making of Iron with Pit-cole and Sea-cole will preſerve Wood and Timber of *Great Brittain* ſo greatly conſumed by Iron-Works of late.

But alſo in reſpect, this my Invention will preſerve many Millions of Tuns of Small-cole in *Great Brittain*, which will be loſt in time to come, as formerly they were, for within ten miles of *Dudley Caſtle*, is annually conſumed four or five thouſand Tuns at leaſt of ſmall Pit-cole, and have been ſo conſumed time out of

mind under ground, fit to have made Pit-iron with; which coles are and (unleſs Iron be made therewith) will be for ever totally and annually loſt; if four or five thouſand Tun of Cole be conſumed within ten miles compaſs, what Coles is thus conſumed in all *England*, *Scotland*, and *Wales?* which is no good Huſbandry for *Great Brittain*, *hinc ille lacrime*, that our Timber is exhauſted.

Muſt I be ſtill oppoſed, and never enjoy my Inventions, nor *Great Brittain* the Benefit?

Muſt my Pattent be obſtructed in Peace, as it was extinct by the Wars?

And muſt not my Pattent be Revived for the making of Iron with Pit-cole, Sea-cole, Peat, and Turf, but find Enemies ſtill to oppoſe it?

How many thouſand Tuns of Iron might have been made but ſince my firſt Invention, *An. Jacob.* 18*th* by my means with Pit-cole, and Sea-cole (loſt) if I had not had Enemies; and had not wood and timber been preſerved? But

But moſt men will aver, that it doth concern the Author to Demonſtrate the great loſſe mentioned formerly of Pitcole annually;

It is thus,

There is at leaſt within ten miles of the Caſtle of *Dudley*, twelve or fourteen Cole-Works, ſome in *Worceſter*, and ſome of them in *Stafford-ſhire* (now in work, and twice as many in that Circute not in work) each of which Works get two thouſand Tun of Cole yearly, ſome get three, four or five thouſand Tun of Coles yearly: and the uppermoſt or top meaſures of Coles are ten, eleven, and ſome twelve yards thick; the Coles Aſcending, Baſſeting, or as the Colliers term it, Cropping up even unto the ſuperfices of the Earth, and there the Colliers formerly got the Coles; but where the Coles is deep and but little Earth upon the meaſures of Coles, there the Colliers rid off the Earth, and dig the Coles under their feet; theſe Works are called Foot-rids.

But of theſe Works there are now but few, ſome of theſe ſmall Coles in theſe open Works, the poor people did carry away, but paid nothing for them in former times, termed the Brain Carriages.

But now the Colliers working more in the deep of theſe Works, they are conſtrained to ſink Pits, ſome of which Pits are from eight unto twenty yards deep, and ſome are near twenty fathome deep, which fathome contains two yards.

In theſe Pits, after you have made or hit the uppermoſt meaſures of Cole, and ſink or digged thorow them, the Colliers getting the nethermoſt part of the Coles firſt, about two yards in height or more, and when they have wrought the Crutes or Staules, (as ſome Colliers call them) as broad and as far in under the ground, as they think fit, they throw the ſmall Coles (fit to make Iron) out of their way on heaps to raiſe them up ſo high, to ſtand upon, that they may, with the working of their Picks or Maundrills o-

ver

ver their heads, and at the one end of the Coles ſo far in as their Tool will permit, and ſo high as their working cometh unto a parting in the meaſure of Cole, the which Coles, to the parting by his ſelf clogging and pondrous weight, fall often many Tuns of coles, many yards high down at once; with which fall and the Colliers breaking of the ſaid Cole, many ſmall coles do ſo abound of no uſe, and fit for no ſale; that in getting of twenty thouſand Tun of Pit-cole, one half near is ſmall cole, not drawn out of the Pits, but deſtroyed, left, and loſt; which ſmall cole, with the fleck thrown moyſt together, (heat the ſooner) and by means of its ſulphurouſneſs fire in the Pits, to no ſmall prejudice unto the Owners of the Works, and the Workmen, beſides *Great Brittains* Loſs; which Cole might have made many thouſand Tuns of Iron, and alſo have preſerved this Iſlands Woods and Timber: I might here give you the names, and partly the

nature of every measure, parting of each cole lying on upon each other; the three uppermost measures are called the white measures for his white Arcenical, Salfuginos and Sulphurious substance which is in that Cole; the next measure, is the shoulder-cole, the toe-cole, the foot-cole, the yard-cole, the sliper-cole, the sawyer-cole, and the frisly cole, these last three coles are the best for the making of Iron, yet other coles may be made use of.

I might give you other names of coles, but desire not prolixity, yet must I tell you of a supernumerary number of Smiths within ten miles of these Cole-Works near twenty thousand; yet God of his Infinite goodness (if we will but take notice of his goodness unto this Nation) hath made this Country a very Granaris for the supplying these Men with Iron, Cole, and Lime made with cole, which hath much supplyed these men with Corn also of late, and from these men, a great part not only of this Island,

Iſland, but alſo of his Majeſties other Kingdomes and Territories with Iron wares have their ſupply, and wood in theſe parts almoſt exhauſted, although it were of late a mighty wood-land Country.

Now if the Coles and Iron-ſtone ſo abounding were made right uſe of, we need not want Iron as we do; for very many meaſures of iron-ſtone are placed together under the great ten yards thickneſs of cole, and upon another thickneſs of coles two yards thick, not yet mentioned, called the bottom-cole, or the heathen cole, as if God had decreed the time when, and how theſe Smiths ſhould be ſupplyed, and this Iſland alſo with Iron, and moſt eſpecially, that this cole and iron-ſtone, ſhould give the firſt, and juſt occaſion for the invention of the making of iron with pit-cole, no place being ſo fit for the invention to be perfected in, then this Country, for the general good; whoſe Woods did formerly abound

bound in Forreſts, Chaſes, Parks and Woods, but exhauſted in theſe parts.

Now for the names of the iron-ſtone, the firſt meaſure is called the Black-row-graines, lying in very hard and black Earth.

The ſecond meaſure is the Dun-row-graines, lying in dun earth or clay.

The third meaſure is called the white row grains, lying in very white Earth or Clay, under theſe three meaſure are ſundry other meaſures, and are called, firſt, the Rider Stone; ſecondly, the Cloud Stone; thirdly, the bottom Stone; fourthly, the Cannock or Cannotſtone; which laſt may wel be ſo caled (although all the other meaſures be very good) yet this Stone is ſo Sulphurous and Terreſtrial, not fit to make Iron; becauſe the Iron thereof made is very Redſhare, which is that if a workman ſhould Draw or Forge out a Share mould fit for a Plough in that red heat, it would crack and not be fit for the Uſe of the Huſband-

mans

mans Plough or Share. I may take occaſion here to ſpeak of the Nature of Coldſhare Iron, which is ſo brittle if made of the grain Oare or Iron ſtone would be almoſt as brittle as ſome *Regulus Antimony* made with Iron for which one ſmall blow over an Anvil you may break the biggeſt Bar that is, if it be perfect coldſhare Iron; nay the Plough-man often breaks his Share point off if it be made of coldſhare Iron. But perfect tough malliable Iron will not break feiſibly in hot-heat or cold, as coldſhare will, or red hot as Sulphurious veneriated redſhare Iron will; but yet tough enough when it is cold: All which aforeſaid qualities of Iron the Authour very well knoweth how to mend their Natures, by finning or ſetting the finery, leſſe tranſhaw more borrow which are terms of art, and by altering and pitching the works, and plates, the fore ſpirit-plat, the tuiron, bottome, back and breaſt or fore-plate, by the altering of which much may be done

done, if the work be ſet tranſhaw and tranſiring from the blaſt, the Iron is more coldſhare leſſe Fined, more to the Maſters profit; leſſe profitable to him that makes it into manufactorage, and leſſe profitable to him that uſeth it; but, the Iron made in a Burrow work, becometh more tough and ſerviceable; yet the nature of all Iron ſtone, is to be conſidered, both in the Furnace, and in the finery, that the Sulphurious Arceniall and Veneriating qualities, which are oftentimes in Iron ſtone be made to ſeparate, in both the works from the fixed and fixing bodies of Iron, whoſe fiery quality is ſuch, that he will ſooner ſelf calfine than ſeparate from any Sulphurious veneriated quality.

No man, I hope, need to be offended at any terms of Art, it hath been alwayes lawfull for Authours of new Arts and Inventions, at their own pleaſures, to give name to their new Inventions and Arts, every Tradeſman is allowed it in his myſtery.

But

But the Authour hath as much as he could avoided the terms of Art that *Simon Sturtenant* and others have uſed, which are very many: onely the Author hath given you the common names and terms (for the moſt part) which are ſo common among Forge-men and Founders, as is nothing more common; but kept ſecret amongſt them and a myſtery not yet known, but unto very few Owners of Iron-works; nay I have not yet troubled your memory with any of the Founder terms, of but making his harth as the Timpe ſtones, the Wind-wall ſtones, the Fuiron ſtones, the Botton-ſtone, the Back-ſtones and the Boſhes, in the making and picking of which harth, is much of the Myſtery.

I muſt confeſſe, there is given unto ſome Phyloſophers, *& filii Artis*, ſome few terms how the Sulphurious Arſenicall, Bituminos, Antimoniall, Venerial, and other poyſonous qualities, either in the Pit-cole, ſea-cole, or the Iron-ſtone, may

may be in part at the Furnace ſeparated, and not permitted to incorporate in the Iron, and if it be incorporated, yet by Fining at the Forge, to fetch it out; alſo to melt extract, refine, and reduce all mines mettals and minerals, unto their ſpecies with Pit-cole, Sea-cole, Peat, and Turff, by wayes not yet in uſe, which the Authour will make known, hereafter, if God permit him health, time and ſpace, or leave his knowledg unto his Brother *Aylmore Folliott*, Eſq; his Nephew *Parkshouſe*, Eſquire; and to his Kinſman Maſter *Francis Dingley*, to declare unto this latter Age of the World, in which God is pleaſed to manifeſt many of his Secrets; *Qui vult ſecreta ſcire, ſecreta ſecrete ſciat cuſtodire.*

Having ſuffered much, ever ſince the Year 1618. unto this preſent, for the general good, as by the preceding diſcourſe appears for the making of Iron with Pitcole, Seacole, Peat, and Turff; for the preſervation of Wood & Timber of Great *Brittain* ſo much exhauſted, for future

future prevention of which,

Is first, to permit the Authour to enjoy His Pattent, and fully to perfect his said Inventions (obstructed in the Reign both of King *James* and in the Reign of his Sacred Majesty King *Charls* the First, of ever Blessed Memory; and lately since his most Sacred Majesties happy Restauration) who desires nothing but to be animated with the Patent revived according unto the Statute of 21. *Iacob.* for Inventors.

Secondly, to impower the Authour or any other Agents to take care that no Pitcole, or Seacole be any wayes wilfully destroyed under ground.

Thirdly, To put all former good Laws in Execution, and to make others for the preservation of Wood and Timber of these Nations, especially neer Navigable River or Seas.

Fourthly, Seeing there goeth out of *England*, *Scotland* and *Wales*, many thousand Tuns Annually of Pitcole and Seacole

coles to furniſh *France*, and alſo the Smiths thereof *Spaine*, *Portugal* and *Flanders*, and eſpecially the Smiths thereof; the *Low-Countries* and the Smiths thereof, beſides the *Hollanders* carries great quanties of our Coles unto Foreigne parts, without which thoſe Countries cannot ſubſiſt: Now the Authors deſire, is, that where there is a conveniency of Iron ſtone or Ewre, the Coles may not be tranſported (paying His Sacred Majeſties Duty) untill Order from His Majeſty or his Privy Council.

Fifthly, That no Pitcole be Exported, ſeeing that Wood fuell and Timber is decayed for Buildings, and inſtead thereof Brickmaking (formerly ſpending Wood, but now coles) is much in uſe; alſo is Glaſſe now made with cole, but formerly were there many Thouſand Loads of Wood fuell ſpent in the making thereof, and the Glaſs Invention with Pitcole was firſt effected near the Authours Dwelling.

Sixthly,

Sixthly, Making of Steel, Brewings, making of Coppras, Allum, Salt, casting of Brasse and Copper, Dyings, and many other Works were not many years since done altogether with the Fuell of Wood and Charcole; instead whereof, Pitcole, and Seacole is now used as Effectually, and to a far better Use and Purpose; besides the preservation of Wood and Timber.

Seventhly, That which is somewhat neerer the mark and Invention; the Blacksmith forged all his Iron with Charcole, and in some places where they are cheap, they continue this course still, but small Pitcole and Seacole, and also Peat and Turff hath and doth serve the turn as well and sufficiently as Charcole.

Eighthly, That which is neareſt, and my perfect Invention, and neer the Authours Dwelling, called *Greens-lodge*, there are four Forges, namely, *Greens-forge*, *Swin-forge*, *Heath-forge*, and *Cradley-forge*.

Which Four Forges have Barred all or moſt part of their Iron with Pitcole ever ſince the Authours firſt Invention, 1618. which hath preſerved much Wood: In theſe Four, beſides many other Forges do the like; yet the Author hath had no benefit thereby to this preſent.

Yet by this Barring of Iron with Pitcole 30000 loads of Wood and more have been preſerved for the general good, which otherwayes muſt have been had and conſumed.

Symon Sturtevant, in his *Mettallica*, in the Epiſtle to the Reader, ſaith, *That there was then* Anno 12. Jacobi *in* England, Scotland, Ireland *and* Wales 800 *Furnaces Forges, or Iron Mills making Iron with Charcole*: Now we may ſuppoſe at leaſt 300 of theſe to be Furnaces, and 500 to be Forges; and each Furnace making fifteen Tun *per* week of Pig or caſt Iron, and work or blow but Forty weeks *per Annum*, but ſome Furnaces make Twenty

ty Tuns of Pig Iron *per* Week, and two Loads of Charcole or there about, go to the making of a Tun of Pig Iron: And two Loads (or two cords) of Wood, at the leaſt, go to the making of a load of Charcole.

Now what Loads of Wood or Charcole is ſpent in great *Brittain* and *Ireland Annually*? but in one Furnace, that makes Fifteen Tun *per* Week of Pig-Iron for Forty weeks: I ſhall give you the Table, and leave you to judge of the reſt of the Furnaces.

15. Tun *per* week ſpends of	*Charcole*, 30 loads	*Wood* 60 loads
Per Annum 40 weeks ſpends	1200	2400 loads

Alſo for one Forge that make Three Tuns of Bar Iron weekly for Fifty weeks, but ſome Forges make double my Proportion, and ſpend to Fine and Bar out

each Tun three Loads of Coles: To each Tun.

3 Tun *per* week	Charcole	Wood
	9 Loads	18 loads
Per Annum	450 loads	900 loads

By these Examples, may you see, the vast quanties of Charcole, or Wood, that the 300 Furnacis spend weekly, or yearly, and the 500. Forges workings all the year, spend little lesse then the Furnaces: It being impossible, after this rate for great *Brittains* or *Ireland*, to supply these her works with Charcole in Fining of Iron at the Fineries, may be permitted to use Charcole, and may be supplyed with under Woods.

Let us but look back unto the making of Iron, by our Ancestors, in foot blasts, or bloomenies, that was by men treading of the Bellows, by which way they could make but one little lump or bloom of Iron in a day, not 100 weight, and that not fusible, nor fined, or malliable, untill

it were long burned and wrought under Hammers, and whoſe firſt ſlag, ſinder or ſcorius, doth contain in it as much, or more Iron, then in that day the workman or bloomer got out, which Slag, Scorius, or Sinder is by our Founders at Furnaces wrought again, and found to contain much Yron and eaſier of Fuſion, than any Yron ſtone or Mine of Yron whatſoever of which ſlag and Sinders, there is in many Countryes Millions of Tuns and Oaks growing upon them, very old and rotten.

The next invention, was to ſet up the Bloomeries that went by water, for the eaſe of the men treading the bellows, which being bigger, and the waterwheel cauſing a greater blaſt, did not onely make a greater quantity of iron, but alſo extracted more iron out of the ſlag or ſinder, and left them more poorer of iron then the foot-blaſts, ſo that the Founders cannot melt them again, as they do the foot-blaſt ſinders to profit: Yet theſe

Bloomeries by water (not altogether out of uſe) do make in one day but two hundred pound weight of iron, or there abouts, neither is it feiſible, or malliable, but is unfined untill it be much burned, and wrought a ſecond time in fire.

But ſome of the now going Furnaces with Charcole, do make two or three Tun of Pigg or caſt iron in 24 hours.

Therefore *I* do not wholly compute the vaſt quantities of charcoles and wood ſpent in theſe voragious works, which quantity of caſt iron, with pit-cole and Sea-cole, at one Furnace *I* deſire not, but am contented with half the proportion, which once *I* attained unto before my Bellows were riotouſly cut, that is one Tun in 24 hours; we need not a greater quantity, if the like quantity were made in Furnaces in *Scotland*, and *Wales*, which abounds with Pit-cole and Sea-cole, as well as *England*; and our ſupernumery Smiths, Founders, and Forgemen, and other Tradeſmen might be there imployed,

ployed, thereby to furnish His Majesties Plantations, as well, if not better then *England*, where Coles are far cheaper then in *England*.

Although vast quantities of Coles do abound near the Authors dwelling, yet twenty thousand Smiths or Naylors at the least dwelling near these parts, and taking of Prentices, have made their Trade so bad, that many of them are ready to starve and steal; so that it is wished there were some courses taken to mend their Trade, imploy them in other parts, or permit them, not to take so many Prentices, all which have great occasions to use Pit-cole, and had not these parts abounded with cole, it would have been a great deal worse with them then it is; but of the cole there is, nor will be any want, nor of iron-stone.

The manner of the cole-veins, or measures in these parts, and also of the measures of iron-stone, or mines, how they lye, be, or increase, some veins lye circuler,

culer, ſome ſami-circuler, ſome ovall, ſome works almoſt in a direct line, and ſome works parts of a Circle; as by the Circle, it being onely for a ſmall Example to judge the reſt of the Mines by may appear.

FINIS.

ΛΛ *East.*
Λ *West.*
ΛΛΛ *North.*

Time not permitting me to give you a Larger Mapp, conclude, &c.

A Two Gutters out of which iſſueth Water, as hot as that at *Bath.*

B The way from *Himley* to *Dudley*, and from *Dudley* to *Burmicham.*

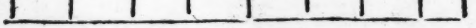
C *Dudley* Caſtle.

O Coles ten yards thick.

O Iron-ſtone four yards thick.

O Coles two yards thick.

The Scale for Cole, and Stone per *yard.*



By the white innermoſt Circle, you may conceive the Scale under to be over in Diameter, a mile and a half.

A
B
C
D